

VERSION WITH MARKINGS TO SHOW CHANGES MADE

TITLE OF INVENTION

Elastic Tape with Transverse Stiffening

BACKGROUND OF THE INVENTION

Elastic tapes are often employed in the field of medicine for immobilizing and stiffening, for instance in orthopedic or other suitable purposes, for example, in stabilizing a broken finger where the stabilization should be around and also in the longitudinal axis. Textile bandages with a woven structure are known for use in this field of art. In a further instance, devices for stiffening the penis from outside are known and described, e.g., in German Patents DE 37 23 746 C2 and DE-OS 875,853, German Utility Model DE 72 43 079 GbM, and U.S. Pat. Nos. 5,360,390, 5,513,652 and 4,785,802, as more or less tubular sheaths, liners and the like which thus act as braces for the body of the penis.

[In German Patent DE-PS 134 368, the body of the penis is stiffened by wrapping a "bandage-like strip of fabric, covered on the inside by an adhesive composition" around it. This fabric is meant to be flexible and elastic, but adhesively bonding these lengths of fabric strips to one another and to the penis means that in use, i.e. during intercourse, this elasticity is in fact lost. Once again the result is a firm, inelastic tube. Although the aforementioned adhesive bonding means that the skin of the penis can be glued to the inside face of the wrapping, given the very loose connective tissue between the skin of the penis and the underlying corpora cavernosa, which make up the actual volume of the body of the penis, the corpora cavernosa can

still retract into the wrapping, along with the glans that is joined to them. Such a retraction could be avoided only by means of a very taut wrapping. But in that case, a layer of adhesive would be more a hinderance than a help. It makes the wrapping hard to handle and does not allow any corrections to be made as the wrapping is being wound into place.]

An improved elastic stiffening band for increasing cohabitation capability is described in German Patent DE 197 24 441 C2 (equivalent to US Patent 6,015,379, incorporated herein by reference). This stretchable elastic stiffening band is wound around the shaft [body] of the penis, and is self-adherent [each individual winding of this bandage band adheres either to the skin of the penis or to another winding solely by static friction]. Rigid reinforcements are disposed crosswise to the winding direction and spaced apart from one another. However, the stiffening possibilities described in this reference entail considerable costs in production.

BRIEF SUMMARY OF THE INVENTION

The object of the present invention is to make use of development [developent] of adhesives, and produce a cost-effective partial stiffening of elastic tapes. To attain this object, a stretchable elastic self-adherent [stiffening] band is provided with [which adheres to both the body part and to its own individual windings solely by static friction, on which] crosswise rigid reinforcements [are provided]. These reinforcements are formed through the application of a liquid material to the elastic tape in the form of strips of beads, which liquid material makes a solid connection with the tape in this state and is cured thereafter to obtain its required stability.

It is highly advantageous if the elasticity of the stiffening band is preserved in between the reinforcements. In fact, the goal here is not to interfere with the longitudinal elastic properties of the tape for its intended function. The spacing of these reinforcements can differ with respect to one another. For example, this spacing may be approximately equivalent to the width of the reinforcements. However, it may also be so slight that the band appears uniform.

Further embodiments of the invention include possible ways of embodying the stiffening band [to engender adequate adhesion between windings on top of one another, as well as between the bottommost winding and the skin of the body part, without having to use adhesive materials.]

BRIEF DESCRIPTION OF THE DRAWINGS

FIG 1: a schematic view of an elastic tape with transverse stiffening according to the invention in the flat state, i.e., not wound around the body part.

FIG 1a: a cross section through an elastic tape with transverse stiffening according to the invention, with reinforcements applied.

[FIG 1b: a longitudinal section through two portions of the stiffening band, joined by sticking together.]

FIG. 2: a longitudinal section through a portion of the elastic tape with transverse stiffening according to the invention, showing the reinforcements applied.

DETAILED DESCRIPTION OF THE INVENTION

The present invention concerns elastic tapes with transverse stiffening, namely

an elastic tape having a transverse stiffening strip which does not essentially hamper elasticity, consisting of a homogenous material which forms a solid connection with the surface of the elastic tape and has been applied in the form of strips [beads]. The invention further concerns an elastic tape wherein the homogenous material of the stiffening strip consists of an adhesive which is applied in liquid form, makes a firm connection with the elastic tape either by adhering to the surface or by the penetration into the loose surface structure of the elastic tape, and which thereafter obtains its required more solid properties by curing.

The embodiment of the invention in FIG. 1 has a preferably one-piece stiffening band **1**. The stiffening band **1** in this example, has a plurality of reinforcements **2**, which can extend over its full height. The elastic intermediate portions **3** between the reinforcements **2** are important for the function of the stiffening band **1** [make the device easier to apply and wrap around the body part]. Expediently, the longitudinal direction of the band, as FIG. 1 also shows, extends in the direction of the total length **L**, so that the reinforcements are preferably disposed at right angles to this longitudinal or winding direction, though the crosswise angle may be oblique rather than right (see the directional arrow **L** in FIG. 1). To adapt to different lengths of body parts, stiffening devices according to the invention of different heights **H** may be provided. The width of the elastic portions may be equal to the width of the reinforcements. However, it is also possible to keep the spacing of the reinforcements from one another so slight that the elastic regions are hardly visible any longer; in other words, such a stiffening band appears uniform.

The design and/or the material of the elastic stiffening band is such that its individual windings are self-adhering [adhere to one another solely by static friction, and static friction also exists between the bottommost winding of the stiffening band and the skin of the body part]. This can be attained by providing that the two faces of the stiffening band have both outward-protruding and complementary indented regions, which enables the aforementioned adhesion. This design may be in the form of a woven structure, for instance. Such a stiffening band may comprise this kind of woven textile material, or suitably formed or impressed plastic or rubber strips. The self-adhesive embodiment of one or both faces of the stiffening bands according to the invention can be accomplished in various ways. For example, they may be Velcro-like adhesion-promoting means (not shown). A self-adhesive embodiment in a woven structure is also possible, of the kind known in elastic bandages.

FIG. 1a shows a schematic cross section through the stiffening band **1** showing the adhesive reinforcements **2**.

[FIG. 1b shows the stiffening band, which is provided on both sides, i.e., on both faces, with a denser structure **4** and a loose portion **5** of a more open structure in the form of bristles or fine hairs **6**, **7**, which protrude vertically from the respective sides and mesh adhesively. This adhesion can be undone by pulling on it appropriately, and can be restored again by exerting suitable pressure.]

FIG 2 shows the adhesive reinforcement stiffening strip **2** seated on the surface of the open structure **5** of the elastic tape **1**. Its extensions **8** have penetrated the loose portion **5** of the elastic tape and solidly adhere to it. The stiffening strip in this

embodiment is a homogenous mass, preferably an adhesive, and is applied in strips [beads] transversely to the longitudinal direction **L** of the tape **1**. When the homogenous mass is applied, it makes a solid connection with the tape, and then obtains its required solidity by means of a curing process. The adhesive can be one which cures in a period of time sufficient for production and can be one which is well tolerated when in contact with the human skin. The adhesive may, further, be a 2-component adhesive, may cure through the action of UV radiation, or may cure by means of a temperature change. One of skill in the art may glean further advantages and characteristics of the invention from the drawings and the associated description given above. A preferred adhesive is Loctite 3321, a UV acrylate adhesive, which is applied in liquid form and contains optical initiators. When this adhesive is radiated under blue light or exposed to UV radiation, the activation of the optical initiators starts the curing process.

One embodiment of the present invention is a longitudinally elastic tape having a transverse stiffening strip **2** which does not essentially hamper elasticity. The transverse stiffening strip **2** consists of a homogenous material which forms a solid connection with the surface of the elastic tape **1**, and has been applied as a liquid in the form of strips [beads]. The elastic property of the tape is still sufficiently preserved.

Another embodiment of the present invention is a longitudinally elastic tape as described above, where the homogenous material of the stiffening strip **2** consists of an adhesive, which is applied in liquid form. In the process, the liquid adhesive makes a firm connection with the elastic tape, either by adhering to the surface or by penetrating

at least one extension **8** into the loose surface structure **5** of the elastic tape **1**. The liquid adhesive thereafter obtains the required solid properties by curing.

The partially-stiffened elastic tape may also be used for orthopedic or other suitable purposes, for example, in stabilizing a broken finger, where the stabilization should be around and also in the longitudinal axis, similar to the stabilization described in DE 197 24 441 C2 (US 6,015,379). One of skill in the art will readily recognize other suitable uses for the partially-stiffened elastic tape according to the invention.

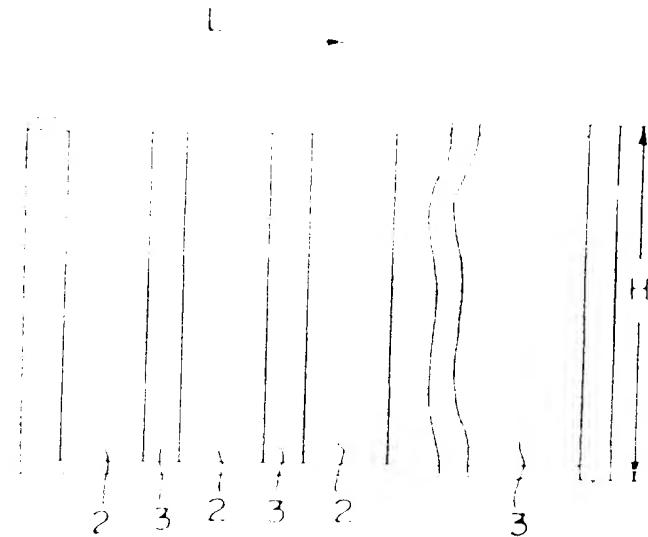
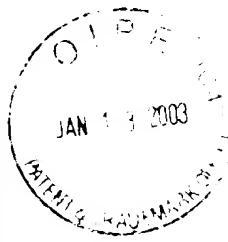


FIG. I



FIG. Ia

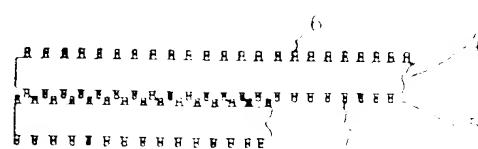


FIG. Ib

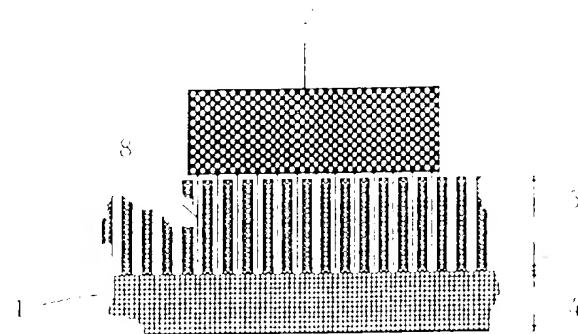


Fig. 2